

Atty. Docket No. PPW06-560DS (OPPO31047US)
Application No: 10/751,172

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Amendments to the Specification

Please replace paragraph [0002] on page 1 with the following replacement paragraph:

[0002] In general, a semiconductor device includes a plurality of transistors, each of which includes a source/drain electrode and a gate electrode in each of device regions separated from one another by a device isolation method such as a LOCOS (local oxidation of silicon) or STI (swallow shallow trench isolation) method, and titanium silicide or cobalt silicide used to reduce a contact resistance of a transistor driving circuit.

Please replace paragraph [0004] on page 1 with the following replacement paragraph:

[0004] Hereinafter, a method of manufacturing the silicide according to the prior art[[s]] is in brief described with reference to Fig. 3 as follows.

Please replace paragraph [0007] on pages 1-2 with the following replacement paragraph:

[0007] Next, as shown in Fig. 3B, a metal film 106 is formed by sputtering metal, such as cobalt for forming silicide in a sputter chamber in a sputter system, on the entire surface of the semiconductor substrate 10100. At this time, the semiconductor substrate 100 is heated at a temperature of 20 – 50°C. After forming the metal film 106, a Ti or TiN protection film 108 for preventing nitridation or contamination of the metal film 106 in the course of a post-heat treatment process is deposited.

Please replace paragraph [0009] on page 2 with the following replacement paragraph:

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[0009] However, in the prior art[[s]] as described above, since the silicide 110 is formed through the post-heat treatment process, and the protection film 108 for protecting a surface of the metal film 106 at the time of the formation of the silicide 110 has to be formed, there is a problem of increase of process time.

Please replace paragraph [0021] on page 4 with the following replacement paragraph:

[0021] Figs. 3A to 3D are views showing a process for silicide according to the prior art[[s]].

Please replace paragraph [0025] on page 4 with the following replacement paragraph:

[0025] In addition, A PMD (pre-metal dielectric) 24 having contact holes (not shown) to expose a portion of regions of the gate poly 16 and the source/drain[[s]] electrodes 20 is formed on the semiconductor substrate 10 where a MOS transistor 22 including the gate oxide 14, the gate poly 16 and the source/drain electrodes 20. Contacts 26 are formed within the contact holes of the PMD 24, and a metal wire layer 28 connected to the contacts 26 is formed on the PMD 24.

Please replace paragraph [0029] on page 5 with the following replacement paragraph:

[0029] In this embodiment, the cleaning process includes a first cleaning step of cleaning the semiconductor substrate 10 using SC1 (standard cleaning: an organic mixture where NH₄OH:H₂O₂:H₂O is 1:4:20) solution, as shown in Fig. 2B, a second cleaning step of cleaning the semiconductor substrate 10 using HF or DHF (dilute HF) solution, as shown in Fig. 2C, and a third cleaning step of plasma-etching the

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semiconductor substrate 10, as shown in Fig. 2D. However, these steps are merely exemplified, not requisite for the present invention.

Please replace paragraph [0034] on pages 5-6 with the following replacement paragraph:

[0034] Next, under a state where the semiconductor substrate 10 is heated at the temperature of 450 - 600°C, the cobalt film 32 is deposited by a sputtering method. At this time, when sputtered cobalt atoms atoms reach the substrate 10, thermal energy by the temperature of the substrate 10 is transferred to the sputtered cobalt atomsatoms. Silicide 3030, with a composition of CoSi, is formed at a surface at which the sputtered cobalt atoms collide with silicon, as shown in Fig. 2E. At this time, it should be understood that the cobalt film deposited on the insulation oxide film 12 or the spacer 18 is not silicified even when thermal energy is transferred to the cobalt film 32. That is, self aligned silicide is formed at the same time of depositing the cobalt film 32.

Please replace paragraph [0035] on page 6 with the following replacement paragraph:

[0035] However, if the temperature of the substrate 10 is high, since a barrier to impede the formation of the cobalt silicide 30' is formed on a the silicon surface due to which transfer of thermal energy is transferred, and silicification is not effectively achieved.

Please replace paragraph [0036] on page 6 with the following replacement paragraph:

[0036] To avoid this, when cobalt is sputtered, the cobalt film 32 is formed by using a cobalt sputter with high power, preferably, a DC power of 2 - 10kW, and a gas for a low pressure process, e.g., argon gas of 40 - 70 sccm. The cobalt atoms atoms

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sputtered from the cobalt sputter with high power can penetrate the barrier formed by thermal energy so that the silicide 30' can be formed.